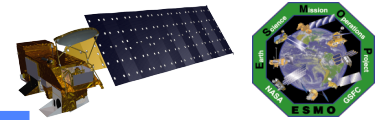




# Aqua Summary

(as of [November 30, 2016](#))

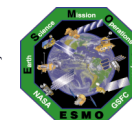
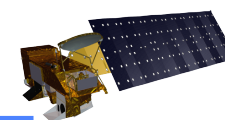


- **Spacecraft Bus** – Nominal Operations (Excellent Health)
  - All Components remain on primary hardware.
  - 13 of 132 Solar Array Strings appear to have failed. One of the intermittent strings appears to have recovered.
  - Significant power generation margin remains.
- **MODIS** – Nominal Operations (Excellent Health)
  - All voltages, currents, and temperatures as expected.
  - All Components remain on primary hardware except 10W Lamps used for calibration.
- **AIRS** – Nominal Operations (<5% of Channels degraded) – (Excellent Health)
  - Cooler A Telemetry is frozen since March 28, 2014 to last known value. Not impacting Science.
  - All other voltages, currents, and temperatures as expected.
  - ~200 of 2378 channels are degraded due to radiation, however they are still useful.
  - Cooler-A Shut Down Anomaly on 9/25, fully recovered on 9/27 (suspected SEU).
  - Cooler-A Telemetry was restored during recovery activities performed on 9/27/2016.
- **AMSU-A** – Nominal Operations for 10 of 15 Channels (Fair Health)
  - All voltages, currents, and temperatures as expected.
  - 3 of 15 channels have been removed from Level 2 processing. 2 channels (#1 & #2) are unavailable.
  - AMSU-A2 Anomaly on 9/24 caused loss of Channels 1 and 2, initial recovery attempts unsuccessful.
  - Investigating potential recovery methods that don't require power cycle of AIRS and CERES instruments.
- **CERES-AFT (FM-3)** – Nominal Operations (Excellent Health)
  - All voltages, currents, and temperatures as expected.
  - Cross-Track and Biaxial Modes fully functioning.
  - All channels remain operational.
- **CERES-FORE (FM-4)** – Nominal Operations (Good Health)
  - All voltages, currents, and temperatures as expected.
  - Cross-Track is Nominal. Biaxial Mode is Nominal when used.
  - The Shortwave channel failed on March 30, 2005; the other two channels remain operational.
- **AMSR-E** – Off since March 2016
- **HSB** – Non-operational since February 2003 anomaly



# Aqua Spacecraft Bus Status

(see Acronyms list at end)

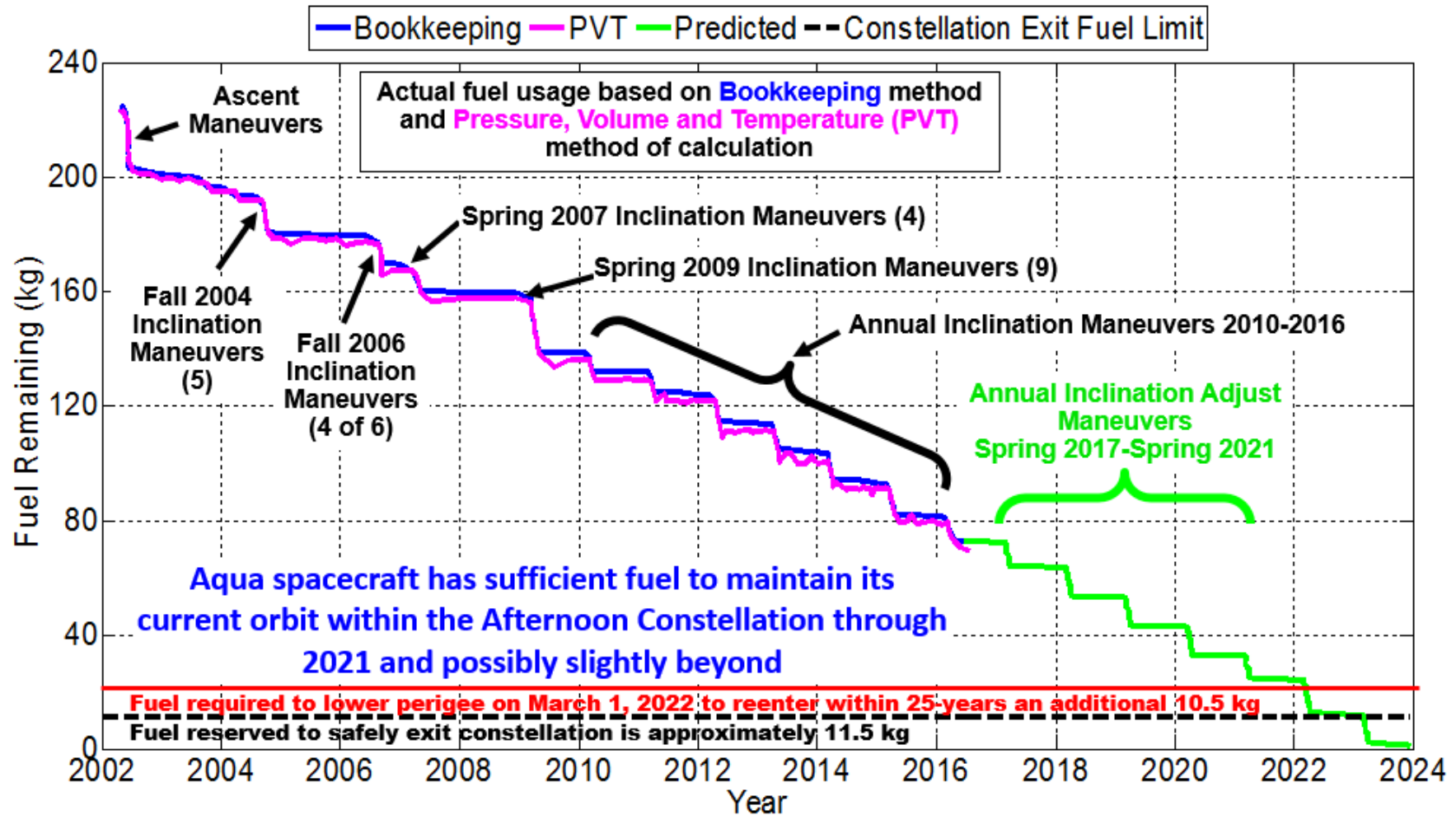
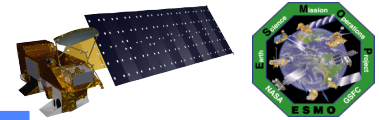


| Subsystem      | Component       | Design      | Current     | Capability | Comments   |
|----------------|-----------------|-------------|-------------|------------|--|
| Elect. Power   | Solar Array     | 132 Strings | 119 Strings | 89%        | 13 out of 132 strings appeared to have failed. The latest string failure (#14) appears to be intermittent and appears to have recovered. |
|                | Battery         | 24 Cells    | 24 Cells    | Full       | Anomalous performance on BMA-2 Cell 4 in September 2005, returned to nominal within weeks.   |
| Thermal        | TCLs            | 42          | 42          | Full       | Nominal Performance  |
| OBC's          | CTC             | 2           | 2           | Full       | Nominal Performance  |
|                | GNCC            | 2           | 2           | Full       | Nominal Performance  |
|                | PC              | 2           | 2           | Full       | Nominal Performance  |
|                | ISC             | 2           | 2           | Full       | Nominal Performance  |
| Communications | X-Band String   | 2           | 2           | Full       | Nominal Performance  |
|                | S-Band String   | 2           | 2           | Full       | Nominal Performance  |
| C&DH           | USO-1           | 2           | 2           | Full       | Nominal Performance  |
|                | USO-2           | 2           | 2           | Full       | Nominal Performance  |
|                | FMU/SSR         | 136Gbits    | 136Gbits    | Full       | Nominal Performance  |
|                | C&T Bus         | 2           | 2           | Full       | Nominal Performance  |
|                | S/C Support Bus | 2           | 2           | Full       | Nominal Performance  |
|                | PC Bus          | 2           | 2           | Full       | Nominal Performance  |
|                | GN&C Bus        | 2           | 2           | Full       | Nominal Performance  |
| GN&C           | CSSA            | 2           | 2           | Full       | Nominal Performance  |
|                | ESA             | 2           | 2           | Full       | Nominal Performance  |
|                | MTA             | 3           | 3           | Full       | Nominal Performance  |
|                | ODE             | 2           | 2           | Full       | Nominal Performance  |
|                | RWA             | 4           | 4           | Full       | Nominal Performance  |
|                | STA             | 2           | 2           | Full       | Nominal Performance  |
|                | SADA            | 2           | 2           | Full       | Nominal Performance  |
|                | TAM             | 2           | 2           | Full       | Nominal Performance  |
|                | VDE             | 2           | 2           | Full       | Nominal Performance  |
|                | WDE             | 4           | 4           | Full       | Nominal Performance  |
| Propulsion     | DTM             | 4           | 4           | Full       | Nominal Performance  |

Aqua Spacecraft Bus is in Excellent Health



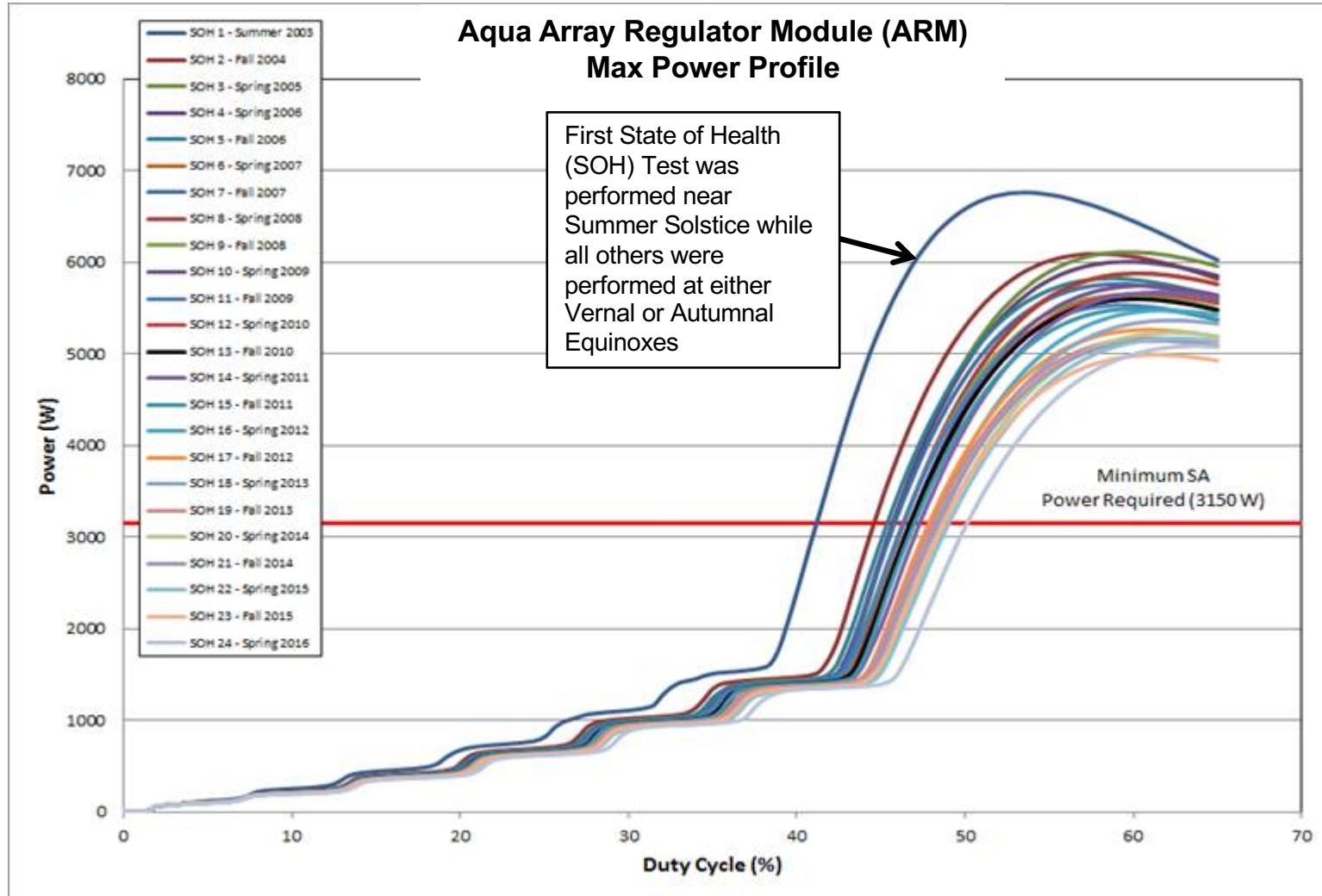
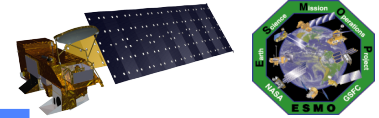
# Fuel Usage: Life of the mission (Updated November 2016)



Fuel usage continues to follow prediction



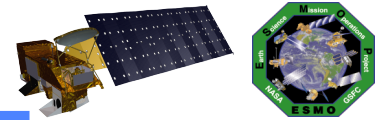
# Aqua Solar Array Power Margin Analysis



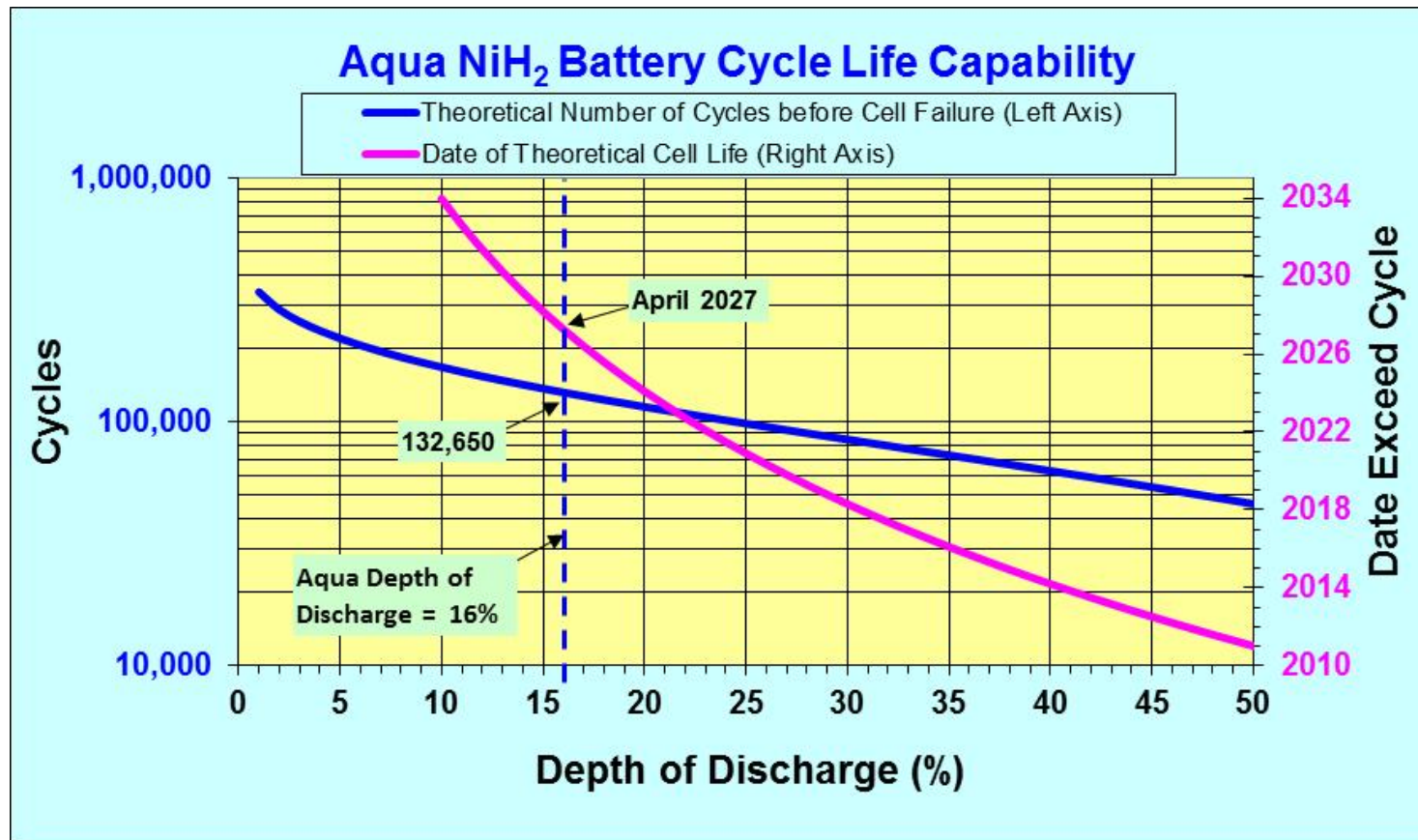
When comparing State Of Health (SOH) tests performed Near Equinoxes, Solar Array degradation has been minimal. Solar Array can provide sufficient power through 2030.



# Aqua Battery Life Projection



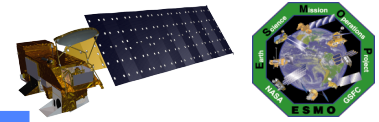
- Extrapolating the Eagle-Picher  $\text{NiH}_2$  Battery Cycle Life Capability data for the typical Aqua Depth-of-Discharge (15-16%) leads to a potential 132,650 cycles from launch that might be achievable with the cells.
- Aqua is projected to reach 132,650 cycles in April 2027.



Aqua Battery Life Capability projected through April 2027



# 2015 Reliability Study



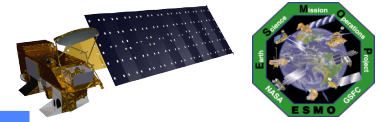
In January of 2015, the Safety & Mission Assurance Directorate (Code 300) Reliability and Risk Analysis Branch (Code 322) at NASA Goddard Space Flight Center updated reliability analysis based on current on-orbit performance, constraints and wear effects due to 12+ years on-orbit for extended mission out to the end of 2022. There is a 92.9% probability Aqua Spacecraft (S/C) Bus will function past 2022. Year identified is end of year.

|   | 2015  | 2016  | 2017  | 2018  | 2019  | 2020  | 2021  | 2022  |
|---|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>S/C Bus</b>  | 0.991 | 0.982 | 0.973 | 0.964 | 0.955 | 0.946 | 0.938 | 0.929 |
| <b>S/C Bus Plus MODIS</b>                                   | 0.972 | 0.946 | 0.921 | 0.896 | 0.872 | 0.848 | 0.825 | 0.802 |
| <b>S/C Bus Plus AMSU-A1</b>                                 | 0.913 | 0.833 | 0.760 | 0.694 | 0.633 | 0.578 | 0.528 | 0.482 |
| <b>S/C Bus Plus AMSU-A2</b>                                 | 0.965 | 0.931 | 0.898 | 0.867 | 0.837 | 0.807 | 0.779 | 0.752 |
| <b>S/C Bus Plus AIRS</b>                                    | 0.980 | 0.960 | 0.941 | 0.922 | 0.904 | 0.885 | 0.868 | 0.850 |
| <b>S/C Bus Plus CERES</b>                                   | 0.991 | 0.982 | 0.972 | 0.962 | 0.951 | 0.939 | 0.926 | 0.912 |
| <b>S/C Bus plus MODIS, CERES</b>                            | 0.972 | 0.946 | 0.920 | 0.894 | 0.868 | 0.842 | 0.815 | 0.788 |
| <b>S/C Bus Plus MODIS, AIRS, AMSU-A1 and AMSU-A2</b>        | 0.831 | 0.692 | 0.576 | 0.479 | 0.398 | 0.331 | 0.276 | 0.229 |
| <b>S/C Bus Plus MODIS, AIRS, AMSU-A1, AMSU-A2 and CERES</b> | 0.862 | 0.745 | 0.643 | 0.554 | 0.477 | 0.410 | 0.353 | 0.302 |



# Aqua MODIS Instrument Facts

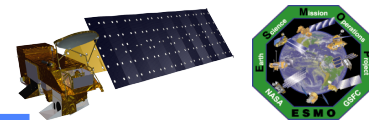
---



- 36-band cross-track scanning radiometer, also on Terra
- Visible to thermal infrared measurements at 0.4-14.5  $\mu\text{m}$
- Spatial resolution: 250 m to 1 km
- Swath width: 2330 km
- Global coverage every 1-2 days
- Heritage: AVHRR, HIRS, Landsat TM, Coastal Zone Color Scanner (CZCS), SeaWiFS
- Prime Contractor: Raytheon Santa Barbara Remote Sensing (SBRS)
- Responsible Center: NASA Goddard Space Flight Center



# Aqua MODIS Instrument Status



- All voltages, currents, and temperatures are as expected.
- There are no disturbing trends in any engineering parameter.
- Aqua MODIS continues to operate on prime equipment.
  - Full redundancy exists except for 10 W Lamps used for calibration
    - Lamps #2, #3 and #4 failed prematurely.
    - Able to use remaining lamp for calibration purpose
    - If the last 10 Watt Lamp (Lamp #1) would also fail, the impact to MODIS Science Data would be minor. The MODIS scientist have nearly phased out data corrections based on calibration as the MODIS data has been very stable.

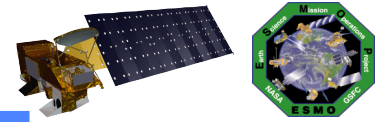
| Life Limiting Items                           | Designed | 5/4/2002 | 11/25/2016        |
|---|----------|----------|-------------------|
| SRCA 10 W Lamp #1 (Hours of use)              | 500      | 200.2    | 357.1             |
| SRCA 10 W Lamp #2 <sup>1</sup> (Hours of use) | 500      | 175.7    | 188.1             |
| SRCA 10 W Lamp #3 <sup>1</sup> (Hours of use) | 500      | 178.5    | 205.7             |
| SRCA 10 W Lamp #4 <sup>1</sup> (Hours of use) | 500      | 57.7     | 135.0             |
| SRCA 1 W Lamp #1 (Hours of use)               | 5000     | 499.5    | 529.3             |
| SRCA 1 W Lamp #2 (Hours of use)               | 5000     | 269.8    | 294.4             |
| Solar Diffuser Door Movements (Open or Close) | 3022     | 1630     | 3330 <sup>2</sup> |
| Nadir Aperture Door Movements (Open or Close) | 1316     | 1046     | 1053              |
| Space View Door Movements (Open or Close)     | 1316     | 624      | 632               |

1. Spectroradiometric Calibration Assembly (SRCA) 10 W Lamp #2, Lamp #3 and Lamp #4 are no longer functional.
2. Solar Diffuser Door Movements have exceeded design. Use of Door has been reduced from once per week to once every 6 weeks. Use of Screen was reduced from once per week to once every three weeks. Modified calibration is possible if door fails.

**Aqua MODIS is in Excellent Health**



# MODIS Lunar Calibration



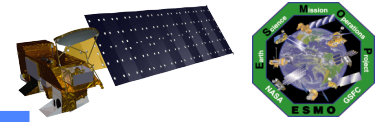
- MODIS Lunar Calibration is performed ~4 days before full moon.
  - Performed when spacecraft roll is less than  $20^\circ$
  - Executed ~10 times annually
- MODIS formatter rate is changed from night rate to day rate during the calibration period.
  - Done every Spacecraft-Day/Night
  - No additional risk to instrument
- Modify sector rotation
  - Done in software only
  - MODIS scan mirror rotation at constant speed regardless of MODIS Roll or nominal science
  - No additional risk to instrument

There are no door or screen closing or mechanical changes to MODIS during MODIS Roll Maneuvers, therefore there is no risk specific to MODIS instrument.

The only added risk regarding MODIS Roll Maneuvers is with the spacecraft being off-pointing during the calibration.



# AIRS Instrument Facts

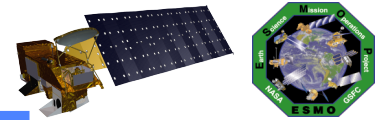


## *AIRS Instrument Facts*

- 2382-channel grating spectrometer unique to Aqua
- Visible/near-IR and IR measurements at 0.41-0.94  $\mu\text{m}$  (4 channels) and 3.7-15.4  $\mu\text{m}$  (2378 channels)
- Spatial resolution: 13.5 km (IR) and 2.3 km (visible) at nadir
- Swath width: 1650 km
- Global coverage every 1-2 days
- Heritage: Advanced Moisture and Temperature Sounder (AMTS), High Resolution Infrared Sounder (HIRS)
- Prime Contractor: BAE Systems
- Responsible Center: NASA Jet Propulsion Laboratory (JPL)



# AIRS Instrument Status



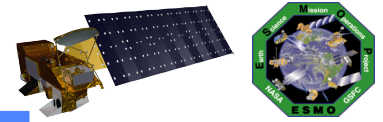
All voltages, currents, and temperatures are as expected.

- Includes scanner currents, cooler drive levels and heater currents
- On September 25, 2016, Cooler-A experienced a shut down anomaly. Anomaly recovery occurred two days later and also cleared a condition that had disabled Cooler-A telemetry since an earlier Cooler-A anomaly in March 2014.
- There are no disturbing trends in any engineering parameter.
- Design has considerable spectral redundancy and channels have a pair of detectors whose outputs are combined onboard allowing for correction if only one detector is degraded.
- Approximately 200 of 2378 infrared channels are degraded, primarily due to radiation.
  - Symptoms: increase in Gaussian and non-Gaussian noise
  - These channels are degraded; however, they are still useful for climate studies where averages over many data samples are taken.
  - Uploaded gain change to correct degraded channels for non-Gaussian Noise. Usually a degraded channel has had only one of the two detectors affected.
    - Corrected 106 Channels on January 21, 2012
    - Corrected 10 Channels on June 10, 2013
    - Corrected 91 Channels on March 23, 2015
    - Additional channels can be corrected depending on science team request
  - Increased solar activity may increase degradation rate since the channels are susceptible to radiation.

**AIRS is in Excellent Health.**



# AMSU Instrument Facts



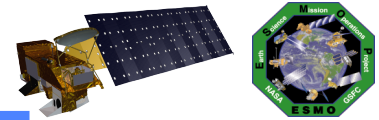
## *AMSU Instrument Facts*

- 15-channel microwave sounder, also on NOAA satellites since 1998
- Microwave measurements at 23-90 GHz (0.3-1.3 cm)
- Spatial resolution: 40.5 km at nadir
- Swath width: 1690 km
- Global coverage every 1-2 days
- Heritage: Microwave Sounding Unit (MSU)
- Prime Contractor: Northrop Grumman Aerospace Systems (NGAS)
- Responsible Center: NASA Goddard Space Flight Center

Note: “AMSU” here is the same instrument as the “AMSU-A” mentioned on other slides in this package.



# AMSU-A Instrument Status

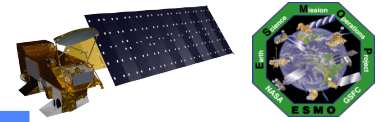


- All voltages, currents, and temperatures are as expected
- There are no disturbing trends in any engineering parameter
- Designed for 3 years (now well beyond design life)
- 9 of 15 Channels show no signs of degradation
- 3 of 15 Channels have degraded and are no longer used for science
  - 05/04/2002: Channel 7 has not met noise specifications since launch (suspect launch related damage) and has never been used
  - 03/05/2008: Channel 4 data removed from level 2 processing; Declared non-operational in November 2007
  - 04/13/2012: Channel 5 data removed from level 2 processing; Declared non-operational in April 2012
- 2 additional channels (#1 and #2) are no longer available as a result of the AMSU-A2 power anomaly on 9/24/2016. Efforts to restore power to the AMSU-A2 module have been unsuccessful. Investigations are underway regarding potential recovery methods that don't require power cycling of other Aqua instruments.
  - 11/29/2016: Anomaly Recovery Team recommended no further commanding
  - Expect to close the AMSU-A2 Power Anomaly in December
- 1 Channel (#6) is slowly degrading but has many years of useful performance remaining based on current degradation rate
- The scanner and 10 channels appear capable of lasting several more years

**AMSU-A is in Fair Health**



# AMSR-E Instrument Facts

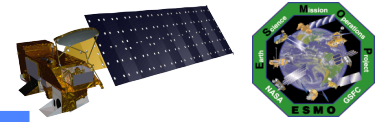


## *AMSR-E Instrument Facts*

- *Instrument type:* Passive microwave radiometer, twelve channels, six frequencies, dual polarization (vertical and horizontal); offset parabolic reflector, 1.6 m in diameter and drum designed to rotate at 40 rpm; six feedhorns to cover six bands in the range 6.9–89 GHz with 0.3–1.1 K radiometric sensitivity.
- *Channels:* 12
- *Spectral Range:* 0.34–4.35 cm
- *Frequency Range:* 6.9–89.0 GHz
- *Swath Width:* 1445 km
- *Spatial Resolution:* 6 km × 4 km (89.0 GHz), 14 km × 8 km (36.5 GHz), 32 km × 18 km (23.8 GHz), 27 km × 16 km (18.7 GHz), 51 km × 29 km (10.65 GHz), 74 km × 43 km (6.925 GHz)
- *View:* Forward-looking conical scan
- *Incidence Angle:* 55°
- *Instrument Field of View (IFOV) at Nadir:* Ranges from 74 km × 43 km for 6.9 GHz to 6 km × 4 km for 89.0 GHz
- *Sampling Interval:* 10 km for 6–36 GHz channels
- *Calibration:* External cold load reflector and a warm load for calibration
- *Accuracy:* 1 K or better
- Global coverage every 1 to 2 days
- Heritage: SMMR (on Nimbus-7 and Seasat), SSM/I (on DMSP), AMSR (on ADEOS II)
- Prime Contractor: Mitsubishi Electric Company (MELCO)
- Responsible Center: Japan Aerospace Exploration Agency (JAXA)



# AMSR-E Instrument Status

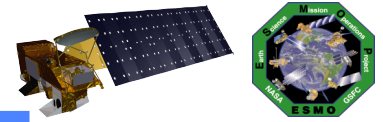


- In October 2011, AMSR-E was no longer able to maintain 40 rpm rotation and was spun down to 0 rpm.
- The cause of anomaly is likely to be a bearing and/or lubrication issue. The AMSR-E instrument far exceeded 3 year design life as the instrument performed nominally for 9+ years although signs of bearing/lubrication wear were obvious.
- To facilitate calibration with the AMSR2 instrument on Japan's Shizuku satellite, the instrument was spun back up to 2 rpm on December 4, 2012 after addressing the risk of potential AMSR-E momentum imbalance that could trip Aqua into safe-hold.
- Antenna was spun down from 2 rpm to 0 rpm due to stall indications observed in telemetry on December 4, 2015. Since AMSR-E spin-down was already planned for December 8, 2015, no recovery actions were conducted.
- Configured the instrument to Survival Mode on December 8, 2015, concluding AMSR-E Operations.

**AMSR-E was turned off on March 2, 2016.  
No plans to turn AMSR-E back on**



# CERES Instrument Facts

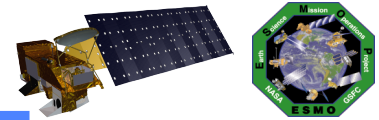


## *CERES Instrument Facts*

- Quantity on Aqua: 2 (CERES-AFT and CERES-FORE)
- Operational On-Orbit: 2-Aqua, 2-Terra, 1-Suomi National Polar-Orbiting Partnership (SNPP)
- Channels: 3 radiometers per instrument
- Spectral Range: One channel each measuring total radiance (0.3 to  $>100\ \mu\text{m}$ ), shortwave radiance (0.3-5  $\mu\text{m}$ ), and the radiance in the atmospheric window at 8-12  $\mu\text{m}$
- Spatial Resolution: 20 km at nadir
- Swath width: Limb to limb of the Earth view
- Field of View:  $\pm 78^\circ$  cross-track,  $360^\circ$  azimuth
- Instrument IFOV: 14 mrad
- Global coverage Daily
- Heritage: Earth Radiation Budget Satellite (ERBE)
- Prime Contractor: Northrop Grumman Aerospace Systems (NGAS)
- Responsible Center: NASA Langley Research Center



# CERES Instrument Status



## CERES-AFT (FM-3)

- All voltages, currents, and temperatures are as expected.
- There are no disturbing trends in any engineering parameter.
  - Bi-axial Mode – Nominal, when used
  - Cross-Track Mode – Nominal
  - No AMSR-E recovery operations impacts

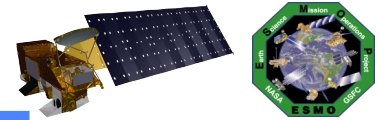
## CERES-FORE (FM-4)

- All voltages, currents, and temperatures are as expected.
- There are no disturbing trends in any engineering parameter.
  - Bi-axial Mode – Nominal, when used
    - CERES FM-4 sensor stopped collecting valid Shortwave channel radiometric measurements on March 30, 2005
    - Failure of the Shortwave channel on one CERES did not prevent the accomplishment of any of the mission's scientific objectives
  - Cross-Track Mode – Nominal
  - No AMSR-E recovery operations impacts

**CERES-AFT is in Excellent Health**  
**CERES-FORE is in Good Health**



# HSB Instrument Facts



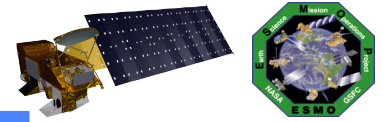
## *HSB Instrument Facts*

- Heritage: AMSU-B
- Instrument Type: Microwave radiometer
- Aperture: 18.8 cm
- Channels: 4
- Spectral Range: 150–190 GHz
- Swath Width: 1650 km
- Coverage: Global every 1 to 2 days
- Spatial Resolution: 13.5 km at nadir
- FOV:  $\pm 49.5^\circ$  cross-track from nadir
- Instrument IFOV:  $1.1^\circ$  (13.5 km at nadir)
- Pointing Accuracy:  $0.1^\circ$
- Scan Period: 2.667 s
- Scan Sampling:  $90 \times 1.1^\circ$  , in 1.71 s
- Sensitivity: 0.3–0.68 K, depending on spectral region
- Prime Contractor: Astrium (formerly Matra Marconi Space, United Kingdom)
- Provider: Instituto Nacional de Pesquisas Espaciais (INPE, the Brazilian Institute for Space Research)

HSB has been non-operational since February 2003 due to an apparent electrical component failure in the scan drive system.



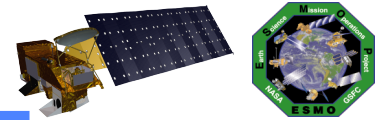
# Data Latency



- EOS Data and Operations System (EDOS): Average **1 hour, 56 minutes** end-to-end from **October 21, 2016 – November 20, 2016**. Latency refers to the amount of time between the start time of the observation and the time that EDOS Level 0 products are delivered to the data processing facilities (DAAC, SIPS, MODAPS, etc.); 30 minutes from Loss Of Signal (LOS) at the ground station until delivery to the data processing facilities.
- Land and Atmosphere Near-real-time Capability for EOS (LANCE) latency: Average time based on the following calculation: from the mid-time of each granule to the time that Level 1, 2, and 3 products are available at the ftp website. *Note:* Each instrument granule has a specific duration, e.g., MODIS granule period is 5 minutes. For the period **October 30, 2016 – November 26, 2016** the average latency was **98 minutes for AIRS and 108 minutes for MODIS**.



# Data Access

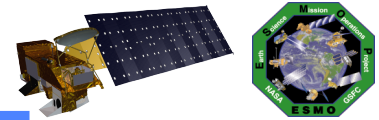


- Realtime Direct Broadcast to over 200 stations world-wide
- **Processed data** are available at the following centers\*:
  - The Goddard Earth Sciences Data and Information Services Center for the AIRS and AMSU data ([disc.gsfc.nasa.gov/AIRS](http://disc.gsfc.nasa.gov/AIRS))
  - The National Snow and Ice Data Center for AMSR-E data and MODIS snow and ice data ([nsidc.org/data/amsre](http://nsidc.org/data/amsre))
  - The Langley Research Center (LaRC) Distributed Active Archive Center (DAAC) for CERES data ([eosweb.larc.nasa.gov](http://eosweb.larc.nasa.gov))
  - The Land Processes DAAC for MODIS land data ([lpdaac.usgs.gov](http://lpdaac.usgs.gov))
  - The Level 1 and Atmosphere Archive and Distributed System for MODIS atmosphere data ([ladsweb.nascom.nasa.gov](http://ladsweb.nascom.nasa.gov))
  - The Ocean Biology Processing Group site for MODIS ocean color data ([oceancolor.gsfc.nasa.gov](http://oceancolor.gsfc.nasa.gov))
  - The Physical Oceanography DAAC for MODIS sea surface temperatures (<http://podaac.jpl.nasa.gov/datasetlist?search=AQUA>)
  - The Land and Atmosphere Near real-time Capability for EOS (LANCE) (<https://earthdata.nasa.gov/data/near-real-time-data/about-lance>)

*\* funded under the ESDIS Project*



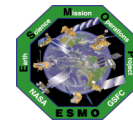
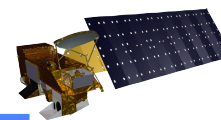
# Acronym List, p. 1



|         |   |
|---------|---|
| AIRS    | Atmospheric Infrared Sounder                          |
| AMSR-E  | Advanced Microwave Scanning Radiometer for EOS        |
| AMSU    | Advanced Microwave Sounding Unit                      |
| AMTS    | Advanced Moisture and Temperature Sounder             |
| ARM     | Array Regulator Module                                |
| AVHRR   | Advanced Very High Resolution Radiometer              |
| CERES   | Clouds and the Earth's Radiant Energy System          |
| CSSA    | Coarse Sun Sensor Assembly                            |
| CZCS    | Coastal Zone Color Scanner                            |
| C&DH    | Command & Data Handling                               |
| C&T     | Command & Telemetry                                   |
| DAAC    | Distributed Active Archive Center                     |
| Delta-i | Inclination Maneuver                                  |
| DMSP    | Defense Meteorological Satellite Program              |
| DTM     | Dual Thruster Module                                  |
| EDOS    | EOS Data and Operations System                        |
| EOS     | Earth Observing System                                |
| ERBE    | Earth Radiation Budget Experiment                     |
| ESA     | Earth Sensor Assembly                                 |
| ESDIS   | Earth Science Data and Information System             |
| ESMO    | Earth Science Mission Operation                       |
| FM      | Flight Model  |
| FMU     | Formatter-Multiplexer Unit                            |
| FOV     | Field of View   |
| GN&C    | Guidance, Navigation & Control                        |
| HIRS    | High Resolution Infrared Sounder                      |
| HSB     | Humidity Sounder for Brazil                           |
| IFOV    | Instrument Field of View                              |
| INPE    | Instituto Nacional de Pesquisas Espaciais             |
| IR      | Infrared  |
| ISC     | Instrument Support Controller                         |
| JAXA    | Japan Aerospace Exploration Agency                    |
| JPL     | Jet Propulsion Laboratory                             |
| LANCE   | Land and Atmosphere Near-real-time Capability for EOS |



# Acronym List, p. 2



|         |   |
|---------|---|
| LOS     | Loss of signal                                  |
| MELCO   | Mitsubishi Electric Company                     |
| MODAPS  | MODIS Adaptive Processing System                |
| MODIS   | Moderate Resolution Imaging Spectroradiometer   |
| MSU     | Microwave Sounding Unit                         |
| MTA     | Magnetic Torque Assembly                        |
| NASA    | National Aeronautics and Space Administration   |
| NGAS    | Northrop Grumman Aerospace Systems              |
| NOAA    | National Oceanic and Atmospheric Administration |
| OBC     | On Board Computer                               |
| ODE     | Orientation Drive Electronics                   |
| PC      | Power Controller                                |
| rpm     | revolutions per minute                          |
| RWA     | Reaction Wheel Assembly                         |
| SA      | Solar array                                     |
| SADA    | Solar Array Drive Assembly                      |
| SBRS    | Santa Barbara Remote Sensing                    |
| S/C     | Spacecraft                                      |
| SeaWiFS | Sea-viewing Wide-Field-of-View Sensor           |
| SIPS    | Science Investigator-led Processing System      |
| SMMR    | Scanning Multichannel Microwave Radiometer      |
| SNPP    | Suomi National Polar-Orbiting Partnership       |
| SOH     | State of Health                                 |
| SRCA    | Spectroradiometric Calibration Assembly         |
| SSMI    | Special Sensor Microwave Imager                 |
| SSR     | Solid State Recorder                            |
| STA     | Star Tracker Assembly                           |
| TM      | Thematic Mapper                                 |
| TAM     | Three-Axis Magnetometer                         |
| USO     | Ultra Stable Oscillators                        |
| VDE     | Valve Drive Electronics                         |
| WDE     | Wheel Drive Electronics                         |